Getting Started with ANITA

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Step 0: Get Familiar with the Command Line

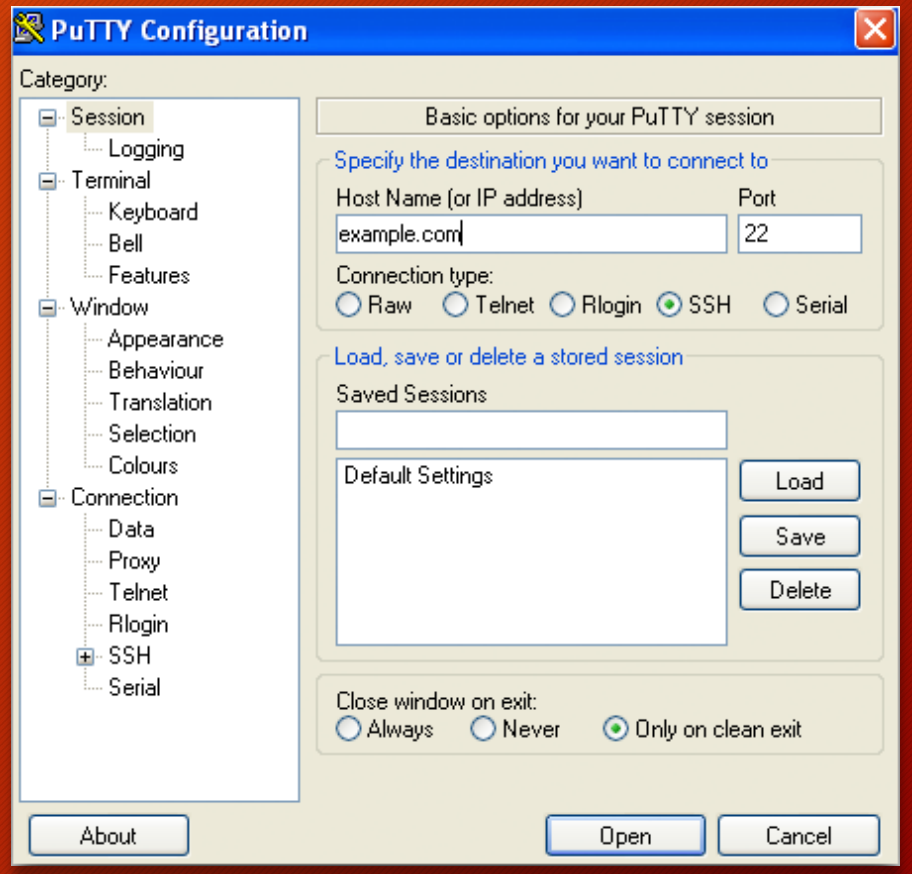
- All of our work will be done on computing clusters
- To interact with the computing cluster, we will need to use the *command line*
- It will allow us to go inside files, delete them, make new ones, run programs, etc.
- Follow this link to learn how to use it: https://www.codecademy.com/learn/learn-the-command-line

Step 1: Get an OSC Account

- For the time being, lets start by having you all do your work on the computing cluster known as ”owens”
- It is maintained by the Ohio Supercomputer Center
- Ask Amy to get an account

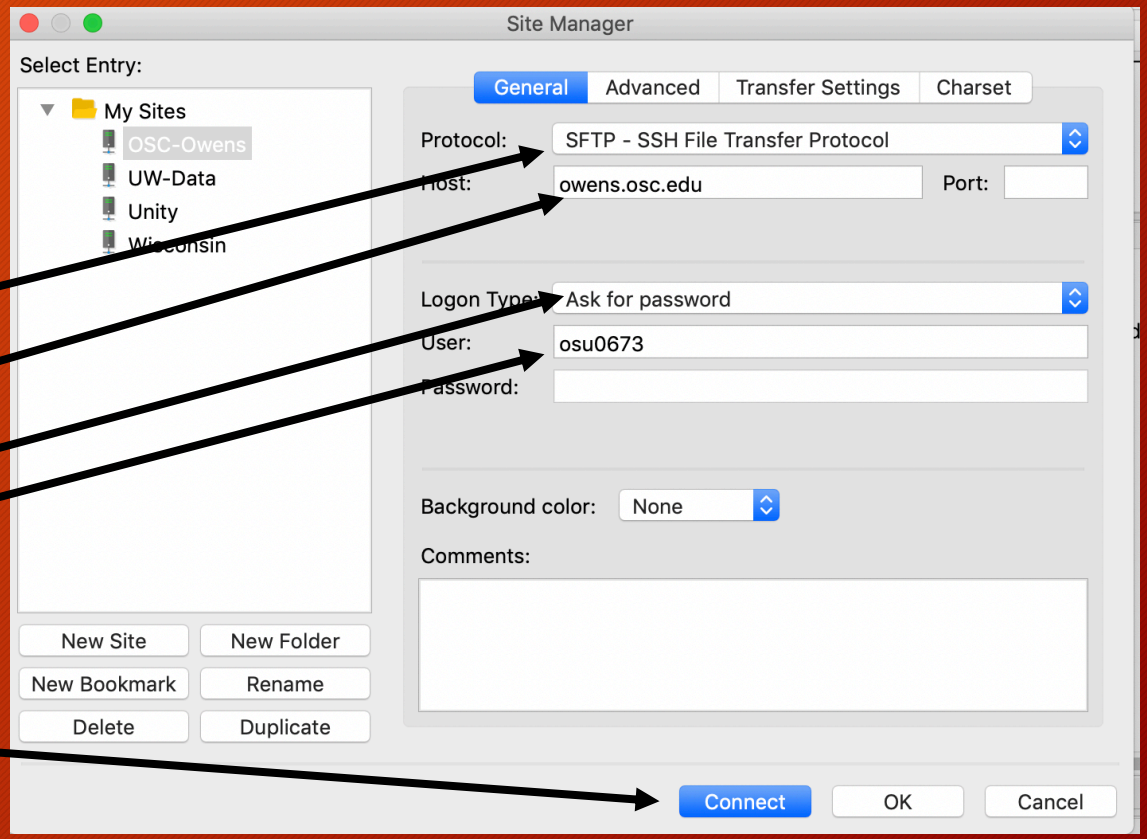
Step 2: Log-In

- Okay, now to log in!
- On a Linux or Mac:
  - Open the terminal, and type "`ssh name.#@owens.osc. edu`"
  - It might ask you to agree to an SSH security token; say yes
  - Then enter your password
- On a PC:
  - You will need to download and install an *ssh tunneling client*
  - The easiest is one called "putty": https://www.putty.org/
  - Install putty, and then open it:
    - For "Host Name", put "owens.osc. edu"
    - For Port choose "22"
    - For "Connection type" choose "SSH"
    - Click "Open"
    - You will then enter your name and password



Step 3: Learn How to Transfer Files

- Throughout your time working on any supercomputer, you'll need to transfer files
- The easiest way to transfer files is by using a file transfer client
- I recommend Filezilla: https://filezilla-project.org/
- Download and install it
- Then launch it
- Click "New Site"
  - Under "Protocol" select "SFTP"
  - Under "Host" put "owens.osc.edu"
  - Under "Logon Type" put "Ask for password"
  - Under "User" put "yourusername"
  - Then click "connect"



Step 3: Pt 2

- The way FileZilla works is very straightforward
- The left panel of your screen is *your* computer
- The right panel of the screen is the remote machine
- To transfer files you literally drag them from one screen to the next
- That's it
- Here are some nice tutorial:
  - https://www.youtube.com/watch?v=rUNQphoGVwQ
  - https://www.youtube.com/watch?v=adxmlHDim6c

Step 4: Download a copy of icemc

- To download a copy of icemc we are going to use a piece of software called "`git`"
- This is what's known as a version control system, which allows developers to track how a piece of code evolves
- We won't use that feature for a while; for now, we're just gonna use it to access the ANITA Code
- Download icemc:
  - git clone https://github.com/anitaNeutrino/icemc

Step 5: Set Up Your Shell Environment

- Your *shell environment* defines variables you want to use
- First, put the files "`bashrc_anita.sh`" into your home directory.
- Open your "`.bashrc`" file and copy the contents of "`sample_bashrc.sh`" into it. Do the same with "`.bash_profile`".
- I'm having you do this because it will *source* several pieces of software you will need (like ROOT) that I've already installed for you to save time
- Make sure to update the variables "ICEMC_SRC_DIR" and "ICEMC_BUILD_DIR" in your .bashrc to wherever you downloaded icemc to in the previous slide

Step 6: Compile icemc

- Next go inside the icemc directory by typing: cd icemc
- Then build by typing “make”
- If the make fails, you should follow the instructions on https://github.com/anitaNeutrino/icemc#getting-icemc

Step 7a: Fix a few things

- Make an “outputs” directory (mkdir outputs)
- Open the “inputs.anita.3.conf” file, and scroll down to the lines with “Digitizer path impulse response” and “Trigger path impulse response” and change the “1” after those lines to “0”
- Scroll further down to the lines “Digitizer noise from flight” and “Trigger noise from flight” and change the “1” after those lines to “0” also
- Because these instructions circumvent the installation of the anitaBuildTool (which real impulse response and noise requires) we have to disable those features

Step 7b: Fix a few more things

- Go into the icemc directory, and open the Makefile
  - Go down near line 19 and 20, and comment out (put a “#” in front of) the lines that say ANITA3_EVENTREADER and ANITA3_EVENTCORRELATOR”

Step 8: Test Run icemc

- Now, we'll make our first set of simulated results!
- Now, execute the command "`./icemc –i inputs.anita3.conf -o outputs/ -n 50000`"
  - This will simulate 50,000 neutrinos
- See if it execute successfully; also, you should check the outputs directory for a bunch of new files
- If it did, well done!

Step 9: Make your First Plot

- Okay, now that we have data, we can make our first plot!
- Move the following two files into your icemc directory:
  - “`test_plot.mk`: the makefile, which tells the computer how to put together your code
  - “`test_plot.cc`”: the code to be put together
- Run ”`make -f test_plot.mk`” (the `-f` says “use this file”)
- Then, execute the plot making code: “`./test_plot outputs/icefinal.root`”
- This will produce a plot! Revel in your brilliance.
- You should actually *read* “`test_plot.cc`” ***very carefully*** to understand everything it’s doing (the explanations are in the comments)